

PATENT SPECIFICATION



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COMPLETE SPECIFICATION.

Improvements in and relating to Metal Sealing Rings for Valves for High Temperature and Pressure Gases or Liquids.

I, FRIEDRICH AXT, of 102, Hauptstrasse at Osthofen, Rheinhessen, Germany, a German Citizen, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

With the altered working conditions in modern steam technology and the increase in pressures and temperatures, the technical requirements of the closure devices such as valves or the like which are employed have become more and more exacting. The annular sealing or seating rings which hitherto have frequently been made of nickel alloys and bronze, are being replaced by rings of pure nickel and particularly by rings of rustless steel. The last named material has been used more and more particularly since it has been possible to bring its co-efficient of thermal expansion to a reasonable value compared with that of the mounting housing.

Homogeneous sealing or seating rings of the kind having a shank zone which is let into a supporting housing have been used for some time but these rings have been of the same hardness throughout. With this type of ring considerable difficulty is experienced in working the shank zone since this is of the same hardness as the sealing or seating zone which is of necessity very hard.

Sealing or seating rings for valves are also known which consist of a shank of base metal such as wrought iron which is let into the housing and a sealing zone of more resistant metal such as chromium nickel steel (i.e. rustless steel) this sealing zone being welded to the shank. It has been found however that this type of ring has various defects due to the welding of the sealing zone to the shank.

The above disadvantages are overcome according to the present invention in that a ring of the same material throughout and preferably of rustless steel has its shank and sealing zones differently treated so that they acquire different tenacities or strengths. The shank zone can then be more easily worked while the

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sealing zone has the requisite degree of hardness.

The very high price of rustless steel together with the fact that it is not particularly easy to work and that its heat treatment involves difficulties, has imposed very narrow limits on the universal utilisation of this material. Sealing or seating rings of this material are normally manufactured from plates, rods, tubes, sleeves or similar forms or else the rings are wrought over a mandrel. It is obvious that these modes of operation are not economical.

The sealing or seating rings before being locally hardened according to the invention, are advantageously prepared as follows. Intermediate standard rings of the most commonly occurring diameters and cross sections are first prepared from the rolled blank by the usual operation of jumping, punching and separating on suitable forging machines, these operations being effected immediately after the production of the rolled product. It is then possible to obtain the final ring from this intermediate standard ring with a very high degree of accuracy and in this way one or more rings may be prepared from a single rolled blank.

The intermediate rings prepared in this manner not only eliminate expensive waste but exhibit at the same time to a remarkable degree the rigidity and quality of the working material. This mode of manufacture permits of carrying out rational mass production with the lowest possible expense which is much less than the amount hitherto involved. In this way it is possible to introduce the general use of this valuable and desirable metal at small cost and to increase its extent of use.

A ring so prepared is then locally hardened by any known method of treatment the final product being a homogeneous sealing or seating ring preferably of rustless steel having its sealing zone hardened to any desired degree of hardness and its softer shank zone readily workable for letting into the supporting housing.

In Figs. 1—4 of the drawing which

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shows a number of methods for securing the shank portion  $a$  in the groove in a housing  $g$ , viz. morticing, wedging, rolling in, springing in and the like, the sealing zone obtained by hardening is indicated by  $b$ .

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A metal sealing or seating ring, for valves used for the passage of gases at high temperature or liquids subjected to heavy pressure, of the kind having a shank zone let into the supporting housing and a sealing or seating zone, in which the ring is homogeneous and preferably of rustless steel and the shank and sealing zones have been differently treated to acquire different tenacities or strengths whereby the shank zone is more readily

workable and in view of its different function the sealing zone is of hardness different from the shank zone rendering it more resistant to wear. 25

2. A metal sealing or seating ring as claimed in claim 1 in which the sealing zone is obtained by hardening, the degree of hardness varying with the conditions of operation and use of the ring. 30

3. Metal sealing ring as claimed in claim 1 or 2 in which the ring is obtained from a rolled blank by jumping, punching and separating on suitable forging or other machines. 35

4. A metal sealing ring substantially as described and shown.

Dated the 18th day of December, 1930.

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Fig. 1.

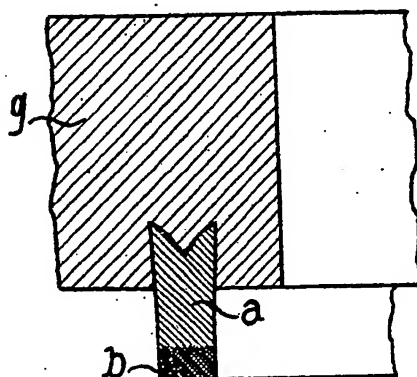


Fig. 2.

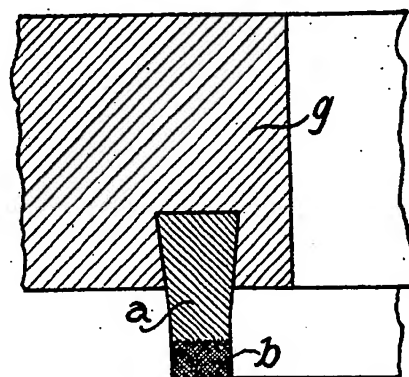


Fig. 3.

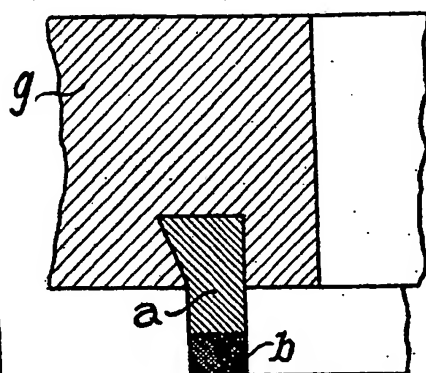
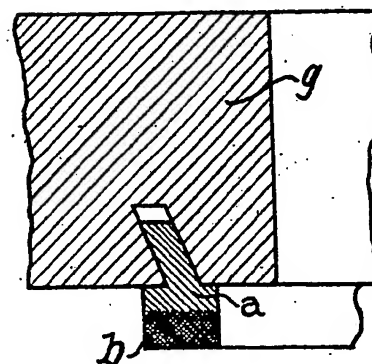


Fig. 4.



[This Drawing is a reproduction of the Original on a reduced scale.]

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